

Mathematics Department Colloquium

Organizer: Olga Holtz

Thursday, 4:10–5:00pm, 60 Evans

Oct. 9 **Leonard Adleman (with students Manoj Gopalkrishnan and Dustin Reishus)**, University of Southern California
On the Mathematics of the Law of Mass Action

In 1864, Waage and Guldberg formulated chemistry's "Law of Mass Action." Since that time, chemists, chemical engineers, physicists and mathematicians have amassed a great deal of knowledge on the topic. In our view, sufficient understanding has been acquired to warrant a formal mathematical consolidation. A major goal of this consolidation is to solidify the mathematical foundations of mass action chemistry: to provide precise definitions, elucidate what can now be proved, and indicate what is only conjectured.

In addition, we believe that the law of mass action is of intrinsic mathematical interest and should be made available in a form that might allow it to transcend its application to chemistry alone. We are led to a dynamical theory of sets of binomials over the complex numbers.

To pique your interest, we will describe how the "Law of Mass Action" over the complex numbers might give information regarding the Riemann Zeta Function and hence the distribution of primes. This is an embryonic and highly speculative part of our work. Here, primes are to Natural numbers as atoms are to molecules. Short computer generated movies will be shown. This is joint work with Ming-Deh Huang.